

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S):

Wu et al.

SERIAL NO.:

10/603,852

GROUP NO.:

2811

FILING DATE:

June 25, 2003

EXAMINER:

Not yet assigned

TITLE:

ETCH STOP LAYER SYSTEM

CERTIFICATE OF FIRST CLASS MAILING UNDER 37 C.F.R. 1.8

I hereby certify that this correspondence, and any document(s) referred to as enclosed herein, is/are being deposited with the United States Postal Service as first class mail, postage prepaid, in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 16 day of December, 2003.

Emily K. Walsh

Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

Sir:

Submitted herewith are:

- 1. Transmittal Form (1 pg.);
- 2. Information Disclosure Statement (2 pgs.);
- 3. Form PTO-1449 (7 pgs.);
- 4. Cited References A1-A69, B1-B8, C1-C42;
- 5. A Return Receipt Postcard; and
- 6. Certificate of First Class Mailing.

/	(O), - ~		Application	Serial Number	İ	10/603,852			
1	1 9 2003		Filing Date			June 25, 2003			
\	III.		First Named Inventor			Wu			
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110	TODAY		Examiner N	lame		Not yet assigned			
	FORM		Attorney Docket No.			ASC-022CPC1			
			Patent No.	. "		Not applicable			
			Issue Date			Not applicable			
•		ENC	CLOSURES (a	heck all that apply)					
Fee Transm			Copy of Notic Parts of Appli	e to File Missing cation		Notice of Appeal to Board of Patent Appeals and Interferences			
□ c	neck Attached opy of Fee ansmittal Form		Formal Drawi	ng(s)		Appeal Brief (in triplicate)			
_	dment/Response		Request For C Examination (Status Inquiry			
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☐ Le D	etter to Official raftsperson ing Drawings			Revocation of Prior Powers)		Certificate of First Class Mailing under 37 C.F.R. 1.8			
	Sheets]		Terminal Disclaimer			Certificate of Facsimile Transmission under 37 C.F.R. 1.8			
Petitio Time	n for Extension of			laration and Power or Utility or Design ation		Additional Enclosure(s) (please identify below)			
☐ Inform Statem	nation Disclosure		Small Entity Statement						
⊠ ⊠	Form PTO-1449 Copies of IDS Citations (A1-A69, B1-B8, and C1-C42)		CD(s) for large table or computer program						
	ed Copy of Priority nent(s)		Amendment After Allowance						
Document(s) Sequence Listing submission Paper Copy/CD Computer Readable Copy Statement verifying identity of above			Request for Certificate of Correction Certificate of Correction (in duplicate)						
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Direct all corres	Testa, Hu High Stre 125 High Boston, M Tel. No.:	et Tower	ibeault, LLP	Date: December <u>/</u> 4, 200 Reg. No. 44,381 Tel. No.: (617) 310-832' Fax No.: (617) 248-7100		Natasha C. Us Attorney for Applicants			



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Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with the provisions of 37 C.F.R. 1.97 and 1.98, Applicants hereby make of record the patents and publications listed on the accompanying Form PTO-1449, and other information contained herein, for consideration by the Examiner in connection with the examination of the above-identified patent application. Copies of the patents and publications are enclosed.

REMARKS

In accordance with the provisions of 37 C.F.R. 1.97, this statement is being filed (CHECK ONE):

(1)	within three (3) months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. 1.53(d), or within three (3) months of the date of entry of the national stage as set forth in 37 C.F.R. 1.491 in an international application, or before the mailing of the first Office action on the merits, or before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. 1.114; or
(2)	after the period defined in (1) but before the mailing date of a final action or a notice of allowance under 37 C.F.R. 1.311, and
	the requisite Statement is below, OR
	the requisite fee under 37 C.F.R. 1.17(p), namely \$180.00, is included herein, or

(3)	after the mailing date of a final action or notice of allowance but before the payment of the issue fee, AND
	the requisite Statement is below, AND
	the requisite petition fee under 37 C.F.R. 1.17(p), namely \$180.00 is included herein.

It is respectfully requested that each of the patents and publications listed on the attached Form PTO-1449, and other information contained herein, be made of record in this application.

In addition, Applicants wish to inform the Examiner about the following co-pending patent applications, including the office actions issued therein:

- 1) U.S. Serial No. 09/764,177, filed on 01/07/2001, by Fitzgerald;
- 2) U.S. Serial No. 09/764,182, filed on 01/17/2001, by Fitzgerald (issued as 6,602,613);
- 3) U.S. Serial No. 09/906,545, filed on 07/16/2001, by Fitzgerald;
- 4) U.S. Serial No. 09/906,551, filed on 07/16/2001, by Fitzgerald;
- 5) U.S. Serial No. 09/923,207, filed on 08/06/2001, by Fitzgerald et al. (issued as 6,583,015);
- 6) U.S. Serial No. 09/928,126, filed on 08/10/2001, by Cheng et al. (issued as 6,573,126);
- 7) U.S. Serial No. 10/116,559, filed on 04/04/2002, by Cheng et al.;
- 8) U.S. Serial No. 10/172,542, filed on 06/14/2002, by Hammond et al.;
- 9) U.S. Serial No. 10/264,935, filed on 10/04/2002, by Lochtefeld et al.;
- 10) U.S. Serial No. 09/599,260, filed on 06/22/2000, by Wu et al.; and
- 11) U.S. Serial No. 09/289,514, filed on 04/09/1999, by Wu et al. (issued as 6,521,041).

Respectfully submitted,

Date: December 16, 2003

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Attorney for Applicants

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FORM PTO - 1449

INFORMATION DISCLOSURE STATEMENT

ATTORNEY DOCKET NO.: ASC-022CPC1

APPLICANT(S): Wu et al.

SERIAL NO.: 10/603,852

FILING DATE: June 25, 2003 GROUP: 2811 U.S. PATENT DOCUMENTS DATE NAME CLASS SUB FILING DATE IF DOCUMENT EXAM. APPROPRIATE **CLASS** INIT. NUMBER 03/01/1977 Ruehrwein 4,010,045 **A1** 05/07/1991 Godbey et al. A2 5,013,681 11/24/1992 Pfiester А3 5,166,084 04/13/1993 Kamins et al. A4 5,202,284 05/04/1993 Bhat et al. A5 5,207,864 05/04/1993 A6 5,208,182 Narayan et al. 05/18/1993 Pfiester et al. A7 5,212,110 Brasen et al. 06/22/1993 8A 5,221,413 Fitzgerald Α9 5,285,086 02/08/1994 Tejwani et al. A10 5,310,451 05/10/1994 09/13/1994 Grupen-Shemansky et al. A11 5,346,848 12/20/1994 Bruel A12 5,374,564 Godbey 05/09/1995 A13 5,413,679 5,442,205 08/15/1995 Brasen et al. A14 Ek et al. 5,461,243 10/24/1995 A15 Dennard et al. A16 5,462,883 10/31/1995 Naruse 12/19/1995 A17 5,476,813 Kitahara et al. 01/16/1996 A18 5,484,664 A19 5,523,592 06/04/1996 Nakagawa et al. 07/09/1996 Ismail et al. 5,534,713 A20 A21 07/16/1996 Kondo et al. 5,536,361 Dennard et al. A22 5,540,785 07/30/1996 A23 5,683,934 11/04/1997 Candelaria 03/17/1998 Mori A24 5,728,623 **DATE CONSIDERED** EXAMINER



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EXAMINER

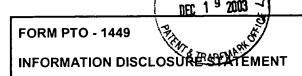
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EXAM. INIT.		DOCUMENT NUMBER		DATE	NAM	E		·	CLASS	SUB CLASS		NG DATE IF ROPRIATE
	A50	6,207,977		03/27/2001	Aug	usto						
	A51	6,210,988 B1		04/03/2001	How	e et	al.		·			
-	A52	6,218,677 B1		04/17/2001	Broe	ekae	rt					
	A53	6,232,138 B1		05/15/2001	Fitzg	geral	d et al.					
	A54	6,235,567 B1		05/22/2001	Hua	ng						
	A55	6,251,755 B1		06/26/2001	Furu	ıkaw	a et al.					
	A56	6,261,929 B1		07/17/2001	Geh	rke e	et al.					
	A57	6,291,321 B1		09/18/2001	Fitzg	geral	d					
	A58	6,313,016 B1		11/06/2001	Kibb	el et	al.					
	A59	6,323,108 B1		11/27/2001	Kub	et a	l.	·				
-	A60	6,335,546 B1		01/01/2002	Tsuc	da et	al.					
	A61	6,350,993 B1		02/26/2002	Chu	et a	i.					
	A62	6,368,733 B1		04/09/2002	Nish	inag	а					
-	A63	6,372,356 B1		04/16/2002	Tho	rntor	et al.					
	A65	6,573,126		06/03/2003	Che	Cheng et al.		l.				-
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	A67	2001/0003269 A1		06/14/2001	Wu	et al	•					
	A68	2002/0125497		09/12/2002	Pitzo	geral	d					
-	A69	2003/0013323		01/16/2003	Ham	nmor	nd et al.					
	<u></u>			FOREIG	N PAT	EN	T DOCU	MENTS				
EXAM. INIT.		DOCUMENT NUMBER	DA	TE	COUNT	ΓRY	CLASS	SUB CLASS	FILING DATE	ABSTR ONLY	ACT	ENGLISH LANG (Y/N)
	B1	0 587 520	03/	16/1994	EP					No		Yes
	B2	0 683 522 A2	11/	22/1995	EP					No		Yes
EXAMIN	 FR				<u> </u>		DATE CO	NSIDERI	ED			<u> </u>

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INFORMATION DISCLOSURE STEMENT

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			FOREIG	N PATEN	T DOCUI	MENTS			
EXAM. INIT.		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	FILING DATE	ABSTRACT ONLY	ENGLISH LANG (Y/N)
	В3	0 828 296	03/11/1998 ,	EP		·		No	Yes
	B4	2000-31491	01/28/2000 ,	JP				No	Yes
	B5	WO 98/59365	12/30/1998	PCT				No	Yes
* , 	В6	WO 99/53539	10/21/1999	PCT				No	Yes
	B7	WO 00/48239	08/17/2000 .	PCT		. ,		No	Yes
· · · · · · · · · · · · · · · · · · ·	B8	WO 01/99169	12/27/2001 .	PCT				No	Yes
			OTHER ART	. JOURNA	AL ARTIC	LES, ET	ΓC.		
EXAM. INIT.	ОТН	ER DOCUMEN	TS: (Including A					of Publication	n)
	C1	Armstrong, "Technology for SiGe Heterostructure-Based CMOS Devices," Thesis Submitted to the Massachusetts Institute of Technology Department of Electrical Engineering and Computer Science on June 30, 1999, pp. 1-154.							
	C2		al., "RBS analysis channels for HM						
	C3	Proceedings	t al., "A New Ultra of the 1999 12 th uary 17-21, 1999	IEEE Internat	tional Conf	for High P erence on	recision M Micro Ele	licromachining ctro Mechanic	," al Systems
	C4		®SMART CUT: A tional SOI Confer					Proceedings o	of the 1995
· · · · · · · ·	C5	Bruel, "Silico pp. 1201-120	n on Insulator Ma 02.	terial Techno	ology," <u>Elec</u>	tronic Let	t <u>ers,</u> Vol. 1	13, No. 14 (Jul	y 6, 1995),
· <u></u>	C6		., "Molecular bea n-insulator substr						n extremely
	C7	-	"Selective Etchin ry 1991), pp. 202		Heterostru	ctures," <u>Jo</u>	ournal of the	he Electrochen	nical Society,
	C8	Chen et al., "	The Band Model emical Society, V	and the Etch ol. 142, No.	ing Mecha 1 (January	nism of Sil 1995), pp	icon in Aq . 170-176	ueous KOH," <u>.</u>	Journal of
EXAMIN	ER	<u> </u>			DATE CO	NSIDERE	D		

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-		OTHER ART, JOURNA	AL ARTICLES, ETC.	· · · · · · · · · · · · · · · · · · ·						
EXAM. INIT.	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)									
	C9	Cheng et al., "Electron Mobility Enhancement in Strained-Si n-MOSFETs Fabricated on SiGe-on-Insulator (SGOI) Substrates," <u>IEEE Electron Device Letters</u> , Vol. 22, No. 7 (July 2001), pp. 321-323.								
	C10	Cheng et al., "Relaxed Silicon-Germanium on Insulator Substrate by Layer Transfer," <u>Journal of Electronic Materials</u> , Vol. 30, No. 12 (2001), pp. L37-L39.								
	C11	Feijoo et al., "Epitaxial Si-Ge Etch Stop La Etchback Silicon-on-Insulator," <u>Journal of I</u> 496.	yers with Ethylene Diamine Pyrocatechol for Electronic Materials, Vol. 23, No. 6 (June 1	or Bonded and 994), pps. 493-						
<u> </u>	C12	Finne et al., "A Water-Amine-Complexing Electrochemical Society, Vol. 114, No. 9 (S	Agent System for Etching Silicon," <u>Journal</u> September 1967), pp. 965-970.	of the						
	C13	Fitzgerald et al., "Relaxed GexSi1-x structures for III-V integration with Si and high mobility two-dimensional electron gases in Si," <u>Journal of Vacuum Science and Technology B</u> , Vol. 10, No. 4 (July/August 1992), pp. 1807-1819.								
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	C15	Fukatsu, "SiGe-based semiconductor-on-insulator substrate created by low-energy separation-by-implanted-oxygen," <u>Applied Physics Letters</u> , Vol. 72, No. 26 (June 29, 1998), pp. 3485-3487.								
	C16	Godbey et al., "A Si _{0.7} Ge _{0.3} strained-layer etch stop for the generation of thin layer undoped silicon," <u>Applied Physics Letters</u> , Vol. 56, No. 4 (January 22, 1990), pp. 373-375.								
	C17	Hackbarth et al., "Alternatives to thick MBE-grown relaxed SiGe buffers," Thin Solid Films, Vol. 369, No. 1-2 (July 2000), pp. 148-151.								
	C18 Huang et al., "High-quality strain-relaxed SiGe alloy grown on implanted silicon-on-insulator substrate," Applied Physics Letters, Vol. 76, No. 19 (May 8, 2000), pp. 2680-2682.									
	C19	Ishikawa et al., "Creation of Si-Ge-based S Proceedings of the 1997 IEEE International								
	C20	C20 Ishikawa et al., "SiGe-on-insulator substrate using SiGe alloy grown Si(001)," <u>Applied Physics</u> <u>Letters</u> , Vol. 75, No. 7 (August 16, 1999), pp. 983-985.								
	C21	Ismail, "Si/SiGe High-Speed Field-Effect Transistors," Electron Devices Meeting, Washington D.C., December 10, 1995.								
	C22	König et al., "Design Rules for n-Type SiGe (1997), pp. 1541-1547.	e Hetero FETs," <u>Solid State Electronics,</u> Vo	ol. 41, No. 10						
 	C23 Leancu et al., "Anisotropic etching of germanium," Sensors and Actuators A, Vol. 46-47 (1995), pp. 35-37.									
EXAMIN	ER		DATE CONSIDERED							



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	-	OTHER ART, JOURN	AL ARTICLES, ETC.						
EXAM. O'	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)								
C	24	LeGoues et al., "Relaxation of SiGe thin films grown on Si/SiO ₂ substrates," <u>Applied Physics Letters</u> , Vol. 75, No. 11 (June 1, 1994), pp. 7240-7246.							
C	25	Leitz et al., "Dislocation glide and blocking Applied Physics, Vol. 90, No. 6 (September 1988)	g kinetics in compositionally graded SiGe/Si, er 15, 2001), pp. 2730-2736.	" <u>Journal of</u>					
C	26	Maiti et al., "Strained-Si heterostructure fie Technology, Vol. 13 (1998), pp. 1225-124	eld effect transistors," <u>Semiconductor Science</u> 6.	ce and					
C	27	Mazara, "Silicon-On-Insulator by Wafer Bo No. 1 (January 1991), pp. 341-347.	onding: A Review," <u>Journal of the Electroche</u>	emical Society,					
C	28	Mizuno et al., "Electron and Hole Mobility Enhancement in Strained-Si MOSFET's on SiGe-on-Insulator Substrates Fabricated by SIMOX Technology," <u>IEEE Electron Device Letters</u> , Vol. 21, No. 5 (May 2000), pp. 230-232.							
С	29	Narozny et al., "Si/SiGe Heterojunction Bipolar Transistor with Graded GAP SiGe Base Made by Molecular Beam Epitaxy," <u>IEEE IEDM</u> (1988), pp. 562-565.							
C	30	Powell et al., "New approach to the growth of low dislocation relaxed SiGe material," <u>Applied Physics Letters</u> , Vol. 64, No. 14 (April 4, 1994), pp. 1865-1858.							
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C	32	Sadek et al., "Design of Si/SiGe Heterojunction Complementary Metal-Oxide-Semiconductor Transistors," IEEE Trans. Electron Devices, Vol. 43, No. 8 (August 1996), pp. 1224-1232.							
С	33	Seidel et al., "Anisotropic Etching of Crystalline Silicon in Alkaline Solutions," <u>Journal of the Electrochemical Society.</u> , Vol. 137, No. 11 (November 1990), pp. 3626-3632.							
C	34		sotropic Si Etch Process Selective to Ge _x Si ₁ ol. 141, No. 2 (February 1994), pp. 507-510						
C	35	Takagi et al., "On the Universality of Inversion Layer Mobility in Si MOSFET's: Part I-Effects of Substrate Impurity Concentration," <u>IEEE Transactions on Electron Devices</u> , Vol. 41, No. 12 (December 1994), pp. 2357-2362.							
C	36	Ting et al., "Monolithic Integration of III-V Materials and Devices on Silicon," Part of the SPIE Conference on Silicon-Based Optoelectronics, San Jose, CA, (January 1999), pp. 19-28.							
C	37	Usami et al., "Spectroscopic study of Si-based quantum wells with neighboring confinement structure," Semiconductor Science and Technology, (1997), abstract.							
C3	Wu, "Novel Etch-Stop Materials for Silicon Micromachining," Thesis Submitted to the Massachusetts Institute of Technology Department of Materials Science and Engineering on May 9, 1997, pp. 1-62.								
EXAMINER			DATE CONSIDERED						



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-	C39		con-on-Insulator P-MOSFET with a SiGe/Si Device Letters, Vol. 21, No. 4 (April 2000), pp. 161-163.					
	C40	Yi et al., "Si _{1-x} Ge _x /Si Multiple Quantum Well Wires Fabricated Using Selective Etching," <u>Mater Research Society Symposium Proceedings</u> , Vol. 379 (1995), pp. 91-96.						
	C41	Substrate Removal Techniques," Electroni	-Based Compliant Substrate Using Wafer Bonding and onic Materials and Processing Research Laboratory, Iniversity Park, PA 16802, (1998), pp. 25-28.					
C42 IBM Technical Disclosure Bulletin, Vol. 32, No. 8A, January 1990, "Optimal Growth Technic Structure for Strain Relaxation of Si-Ge Layers on Si Substrates," pp. 330-331.								
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